ZOÖLOGY.[1]

NOTES ON THE LAND-SHELLS OF DOMINICA.—Mr. Guppy, in the *Annals and Magazine* for 1868, has some remarks on the shells of Dominica, which are partly reproduced by Bland (*Am. Jour. Conch.*, Vol. IV., 1868). My stay in Dominica was too short to allow of a complete investigation of the conchology of the island, but was long enough to enable me to ascertain that Guppy's notes, especially as to the distribution of the shells, are extremely erroneous. He says, "on the lower slopes near the sea I found a few Mollusca, chiefly *Bulimus exilis*, *Stenostoma octona*, *Succinea approximans* and *Helicina humilis*. Ascending higher, we find *H. denticus*, *H. badia*, *H. josephinæ*, *H. nigrescens*, *Amphibulina patula*, *B. laticinctus* and *Heligina epistilia*. Excepting the last, all these species are found everywhere above 300 or 400 feet of elevation." The fact is that while the first-named species are found on the lower slopes, they are not all which are so found. *H. badia* and *H. denticus* are found abundantly in the gardens in Roseau, but disappear or occur but very sparingly above 800 feet, their place being taken by *H. nigrescens* and *H. josephinæ*, which I have never detected below 800 feet. My notes are necessarily imperfect, but through the kindness of my friend, Dr. H. A. Alford Nicholls, of Roseau, who is making observations and collecting for me, and by more extended collections which I hope to make in person this winter, I shall be able to add to them.

I append a list of the species, not as a complete list of the shells of Dominica, but only of those which I have myself collected.

Helix baudoni Petit.—So closely allied to *H. concolor* Fer., that I doubt its claim to specific rank. Not common. Road from Roseau to Rosalie; 2000 feet. I have not detected it on the lower slopes.

Helix badia Ferussac.—Abundant on the lower slopes down to sea level, but occurs very sparingly above 800 feet. All the specimens I have seen are smaller than those from Guadeloupe or Martinique.

Helix josephinæ Ferussac.—Quite abundant above 1000 feet. Last whorl more rounded than in the Guadeloupe specimens.

Helix denticus Ferussac.—Common on the lower slopes down to sea level; rare above 800 feet.

Helix nigrescens Wood.—Abundant above 1000 feet.

Bulimus virginalis Pfeiffer.—On trees 2000 feet; not common.

Bulimus multifasciatus Lamarck.—On trees 2000 feet; not common.

Bulimus exilis Gmelin.—Abundant below 1000 feet; occurs more sparingly above this height.

[1] The departments of Ornithology and Mammalogy are conducted by Dr. ELLIOTT COUES, U. S. A., Washington, D. C.

Bulimus nichollsii Nob.—Quite common on road from Roseau to Rosalie; 2000 feet.

Stenogyra octona Chemnitz.—Abundant everywhere.

Tornatellina antillarum Shuttleworth.—Sparingly at about 500 feet.

Succinia approximans Shuttleworth.—Not common; 300 feet.

Succinia rubescens Deshayes.—Not common; 300 feet.

Amphibulina patula Bruguiere.—Not common; on bananas at Laudat; 2000 feet. Shell rather larger and more corrugated than the St. Kitts specimens.

Amphibulina tigrina Lesseur.—Rare, 1000 feet on bananas. I have not seen *A. pardilina* Guppy, but fancy it may prove this.

Cyclophorus schrammi Shuttleworth (?).—Quite common at 1500 feet. I can see no difference between this and specimens of *C. schrammi* from Guadeloupe. *Cyclotus amethystinus* Guppy, I have not seen, but from his own description it is evident that his shell is not a Cyclotus but a Cyclophorus, and presumably this species.

Helicina platycheila Muhlfeldt. Not common; 800 feet.

Helicina rhodostoma Gray. Not common; 1500 feet.

Helicina fasciata Lamarck.—Not rare; 800 feet.

Helicina antillarum Sowerby. Common everywhere, but most abundant in the lower slopes.

Bland (Ann. Lyceum, Vol. x, 1872) quotes a letter from Dr. W. J. Branch, of St. Kitts, to the effect that *Amphibulina patula* is unable to contract the entire animal within the shell, but expresses his doubt as to the truth of this observation. I have frequently seen the animal completely contracted within the shell in living specimens, although it is not its usual habit even when alarmed; if thrown into alcohol or glycerine, it immediately withdraws the whole body into the shell.

In giving the altitude at which the different species occur, I mean, that so far neither Dr. Nicholls nor myself have found them at any less elevation. Further search in which Dr. Nicholls is now engaged will undoubtedly extend their range, but I am quite confident that none of the species will be found to vary materially from these figures in their distribution as to elevation.—*A. D. Brown.*

Breeding Habits of the European as Compared with those of the American Oyster.—Regarding this interesting subject, we print the following extract from a letter from Capt. Francis Winslow, U. S. N., to Prof. W. K. Brooks, of Johns Hopkins University.

"U. S. S. Saratoga, Gibraltar, June 14, 1880.

"I got hold of some oysters in Cadiz a few days ago, and upon examining them found them in so favorable a condition that I attempted to fertilize the eggs according to your method, and I thought you might like to know that the experiment has been

completely successful. The young are now eight days old, and are thriving wonderfully. I labor under a great many inconveniences, and against many obstacles, having only a couple of fruit jars to hold the animals, and a very poor little microscope, but it is sufficiently powerful to enable one to trace the course of development in a general way, and that I have done.

"Of course I have a good many other duties, and since our arrival here I have been trying to find out some things about the sub-current in the Straits, consequently I could not give the oysters all the attention I desired, but I have followed them through each step as nearly as possible, and they have been exactly as you have figured for the American animal. I have seen them assume the form of each figure or set of figures[1] successively, and they are now about as your last figures show them. I shall watch them as closely as possible henceforward, though the necessity for transferring them to a larger vessel, may prevent my continuing the observations, and as we sail to-morrow, a gale of wind may send my young brood afloat again in the briny ocean. I think my success is due to the uniform temperature of my room where I have kept the jars. Though I have not registered it, yet it must be nearly the same at all times, for I am personally aware that the atmosphere is rarely changed in any way. The brood is the offspring of two males and two females, and the whole lot which I examined appeared exactly as did those we are familiar with. The adults came from the waters of Cadiz bay, and are natives.

"So far as these results go, they prove that the artificial propagation of the European oyster is practicable to just the same extent as our own, and I think that it throws grave doubts upon the theory that the embryo is protected within the shell, and that the impregnation of the ova occurs there and nowhere else.

"I am quite elated over my success, and thought that probably it would interest you, and therefore have written. I have made but one deviation from your method, and that was in the supplying of water. I have given but very little new water, rarely a gill and a half a day. I am very truly yours, FRANCIS WINSLOW."

CHANGE IN THE NERVOUS SYSTEM OF BEETLES DURING METAMORPHOSIS.—This subject has been studied with great thoroughness of detail in text and illustration by H. Michels. (See the Zeitschrift für wissenschaftliche Zoologie for September 10, 1880.) The figures are the most important ever given, supplementing and greatly extending Newport's celebrated figures of the changes in the sphinx from the caterpillar to the moth, as well as Weismann's researches on the flesh fly. Michels concludes that the separate ganglia of the ventral cord of the pupa and imago are formed during metamorphosis from the larval stage, not *de novo*,

[1] See Prof. W. K. Brook's, the Development of the Oyster. Studies from the Biological Laboratory of Johns Hopkins University.—*Eds.*

but that the different ganglia persist from the larval state. The peripheral nerves also persist or survive from the larva to the beetle (the species studied was *Oryctes nasicornis);* besides there is an increase in the number, or accession of new nerves different from those in the larva, and peculiar to the beetle.

A *punktsubstance*, in Leydig's sense, appears to be wanting, as also the transverse commissures usually uniting the hemispheres of a ganglion. In place of the latter are extraordinarily numerous transverse bundles of fibers which, arising from the ganglion cells of one side, form the peripheral nerves of the other side, and also a bundle which passing through the interlacing of each half of the ventral cord, assumes three longitudinal directions. These nerve-fibers running parallel to the axis pass continuously from one end of the ventral cord to the other, forming in fact the longitudinal commissures of the ventral cord. These commissures take their origin neither out of a central punktsubstance, nor from a peripheral ganglion mass, but are mere continuations of longitudinal nerve-fibers decreasing posteriorly in thickness, and which extend through the œsophageal ring commissures to the brain.

A NEW GENUS OF CATOSTOMIDÆ.—Prof. D. S. Jordan, informs me that the dentition of his genus *Chasmistes* is identical with that of *Catostomus*. The two species from Klamath lake, Oregon, described by me under the names of *Chasmistes luxatus* and *C. brevirostris* (AMERICAN NATURALIST, 1879, 785), exhibit a different type of dentition. The pharyngeal bones are very slender and are flattened, and their teeth are minute and very numerous, as in *Carpiodes*. The genus thus defined will stand in the *Catostomine* division, and next the *Bubalichthyinæ*, and may be called LIPOMYZON.—*E. D. Cope.*

CELLULAR IRRITABILITY.—M. Richet in the *Revue Scientifique*, gives the following synopsis of the effects of stimuli on simple animal and vegetable cells. (1) Oxygen is necessary, and there is consumption of oxygen during the life of the cellule. (2) The intensity of movements grows with the temperature, up to 40° C.; above 40° the movements disappear. (3) Neutral solutions slightly alkaline are favorable; acid solutions are fatal. (4) All change of condition is a stimulant to the cell, and consequently provokes its contraction. (5) But this change of condition must be abrupt, for, if gradual, it does not provoke reaction. (6) The reaction from the stimulus is not sudden, but there is a period of "latent excitement" which diminishes in proportion to the intensity of the excitation. (7) Weak stimulation, powerless when isolated, becomes effective when frequently repeated at short intervals.

BUDDING IN FREE MEDUSÆ.—The germination of the young from the walls of the proboscis of *Lizzia octopunctata* Forbes, seems to me to throw some light on a theoretical question of

"alternation of generation" in Willia, raised by Dr. Brooks in the September number of the NATURALIST. *Lizzia octopunctata* produces young by budding from the time she is herself attached to the parent until she acquires the form as figured by Forbes. After that time reproduction by gemmation, in the restricted sense of the word, ceases, and a sexual method takes its place. I have studied one of these Lizziæ in which the eggs had begun to form while yet buds were attached to the proboscis of the same. Can we not, therefore, instead of considering that there are two separate forms of Willia, one of which forms a new generation asexually, and another which reproduces by the egg, suppose, as is the case in Lizzia, that in the same individual, after the asexual method ceases, we have as final products of the somewhat similar process, the formation of eggs which, after contact with the sperm, pass through a sexual development?

If there are two forms of *Willia ornata*, they may be simply male and female. Was the "second form" of Willia, spoken of by Dr. Brooks, male or female? Before its sex is known, the theory of "alternation of generations," which he advances, is premature, and when it has been shown that the "second form" is a female, it remains to be demonstrated that the asexual "first form" does not ultimately develop into the second which lays eggs.—*J. Walter Fewkes, Cambridge, Dec. 6, 1880.*

ZOOLOGICAL NOTES.—Prof. Ercolani has recently studied the placenta of cartilaginous fishes, and of mammals, with reference to classification and anthropogeny. Another Italian, Prof. Ciaccio has communicated to the Academy of Sciences of Bologna the results of his examination of the intimate structure of the eyes of Diptera, and also those of a blind Talpa.——Mr. Swinton's book on "insect variety" is not favorably reviewed by *Nature;* though it is said to be full of original observations. It is devoted mainly to the subjects of mimicry, odors, dances, colors, music, and insect variation.——A writer in *Nature* confirms Mr. Ober's statement in his "Camps in the Caribbees," as to the singular habit of the gnat beetle, *Dynastes hercules*, which seizes hold of a branch of a tree, and whirls around by its wings until the limb is severed. Mr. Ernst, of Caraccas, says the beetle wants to get at the abundant juice of the young branches. He adds that the *Golofa porteri*, an allied insect of the same family, behaves in a similar way, but chooses of course thinner branches.——The *Zoologischer Anzeiger* for November 1, contains the conclusion of Studer's notice of sexual dimorphism in Echinoderms.——The structure of the poison apparatus of spiders has recently been studied by J. MacLeod of Belgium.——About 7800 species of Heteropterous Hemiptera had been described up to the year 1879, while up to 1859 about 3000 species of Homopterous Hemiptera had been catalogued. Mr. Uhler has estimated that there are probably not less than 10,000 species of North American Hemiptera.